UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,638	12/31/2003	Mark Charles Hakey	ROC920030384US1	9409

30206 7590 12/29/2005

IBM CORPORATION
ROCHESTER IP LAW DEPT. 917
3605 HIGHWAY 52 NORTH
ROCHESTER, MN 55901-7829

EXAMINER	
GUTIERREZ, KEVIN C	

ART UNIT	PAPER NUMBER
2851	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/749,638	HAKEY ET AL.	
	Examiner	Art Unit	
	Kevin Gutierrez	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) *21-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *9-13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I (claims 1-20) in the reply filed on December 8, 2005 is acknowledged.

2. Claims 21-33 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on December 8, 2005.

Claim Objections

3. Claim 17 is objected to because of the following informalities: Page 4, claim 17 - "...wherein a cross section said final lens element..." seems to contain a typographical error where the word "of" should be inserted between the two underlined text as suggested by the Examiner. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Yabu (4,907,021).

Regarding claim 1, Yabu discloses

• "a frame (4a-c; lens barrel);

• a lens system (3; projection lens) disposed within said frame;

• a horizontal support surface (18; wafer stage) generally associated with said frame capable of holding a semiconductor wafer (17);

• a final lens element (3c) in said lens system, positioned near a first end of said frame (near end of barrel near wafer 17), said final lens element having a final lens element surface (see fig. 1, where 3c has curved surfaces), said final lens element surface capable of being positioned near said semiconductor wafer (col. 7, lines 12-15); and

• a light source (22; illumination system) positioned near a second end of said frame (4a-4c), said light source capable of passing light through said lens system (col. 4, lines 26-32);

• wherein said final lens element is capable of movement relative to said frame (col. 7, lines 12-15, where the position of 3 can be adjusted)."

Regarding claim 15, Yabu discloses "wherein said apparatus exists in a closed environment where an atmosphere of said closed environment is primarily composed of one or more elements or compositions selected from the group consisting of: argon, dry nitrogen, and air (col.5, lines 46-49, where apparatus is provided with air)."

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yabu in view of Suwa (5,825,043).

Yabu disclose a final lens element surface, but does not disclose "wherein a proximal lens surface on said final lens element surface is partially or totally submerged in a liquid when in an operable position."

However, having "wherein a proximal lens surface on said final lens element surface is partially or totally submerged in a liquid when in an operable position" is known to the art as it is evident by the teaching of Suwa (Figure 9, col. 23, lines 2-5). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Yabu by including a liquid and having a surface of the final lens element partially submerged for at least the purpose of enhancing the resolution of the projection optics.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yabu in view of Suwa, as applied to claim 2, and in further view of Epple et al (US 2004/0109237).

Yabu, as modified, discloses a liquid utilized in the apparatus, but does not disclose "wherein said liquid is selected from the group consisting of: deionized water, perfluorinated polyethers."

However, having a liquid of deionized water or perfluorinated polyethers is known to the art as it is evident by the teaching of Epplet et al ([0035], last sentence). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the liquid of Yabu as modified by utilizing deionized water for at least the purpose to reduce the quantity of undesired particles.

9. Claims 3-6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yabu in view of Suwa, as applied to claim 2, and in further view of Johnson (US 2002/0080226).

Regarding claim 3, Yabu as modified discloses a device that produces z dimensional movement, but does not disclose a "first motion control device capable of producing an x, y, and z dimensional movement between said horizontal support surface relative to said frame."

However, having a "first motion control device capable of producing an x, y, and z dimensional movement between said horizontal support surface relative to said frame" is known to the art as it is evident by the teaching of Johnson ([0042], lines 2-4, where device **22** is capable of moving a lens in a planar direction). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Yabu by including the device of Johnson to provide additional movement in a planar direction for at least the purpose of promoting focus adjustments of the projection optics.

Regarding claim 4, Yabu as modified further discloses movement by a first control device and further discloses a second control motion device capable of moving final lens element relative to frame as taught by Johnson.

Regarding claims 5 and 6, Johnson further discloses "wherein said final lens element is capable of angular movement about an axis ([0042], lines 3-4)."

Regarding claim 8, Yabu further discloses "wherein said first motion control device is selected from one or more of the group consisting of a computer system, a motor, a belt system, a threaded or keyed shaft, a gear system, a cam mechanism, and a manual mechanism controlled by an operator (col. 3, lines 64-66 and col. 4, lines 20-25; where the driving circuit **11** consists of a CPU, which is controlled by a converter **14** and/or the condition detector **20**)."

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yabu and Suwa in view of Johnson, as applied to claims 3-6, and in further view of Hazard (4,978,212).

Yabu as modified discloses all of the claimed limitations except "wherein one or more coupling points are coupled to said final lens element by extension connectors."

However, having "wherein one or more coupling points are coupled to said final lens element by extension connectors" is known to the art as it is evident by the teaching of Hazard (col. 4, lines 64-67, where a shaft is coupled to a first optics). Thus, it would have been obvious to one ordinary skilled in the art at the time the

invention was made to further modify the final lens element of Yabu as modified to have one or more coupling points are coupled to said final lens element by extension connectors for at least the purpose of varying the focal distance of lens element.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yabu in view of Takahashi et al (US 2002/0044260).

Yabu discloses wherein said apparatus is supplied with air, but does not disclose "wherein said apparatus exists in a closed environment where an atmosphere of said closed environment comprises one or more inert optically transparent gases."

However, having "wherein said apparatus exists in a closed environment where an atmosphere of said closed environment comprises one or more inert optically transparent gases" is known to the art as it is evident by the teaching of Takahashi et al ([0223], last sentence). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the apparatus of Yabu by having said closed environment comprises of one or more inert optically transparent gases for at least the purpose to reduce the amount of absorptive gases.

12. Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being obvious over Yabu.

Regarding claims 17 and 20, Yabu discloses all of the claimed limitations except "wherein a cross section of said final lens element is substantially cylindrical."

However, Yabu disclose a lens barrel **4a-4c** for holding the lens components of the projection lens system **3**. Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the final lens element of Yabu by having a cylindrical cross-section for at least the purpose of fitting securely in a cylindrical lens barrel.

13. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yabu in view of Maruyama (6,191,889).

Regarding claims 18 and 19, Yabu discloses a final lens element but a first and second curved surface, but does not disclose wherein said final lens element comprises a first curved surface region and a second curved surface region where a degree of curvature of said first curved surface region is greater or less than the degree of curvature of said second curved surface region and said second curved surface region substantially faces said horizontal support surface."

However, having said final lens element with a first and second curved surface where a degree of said first curved surface region is greater than the degree of curvature of said second curved surface region is known to the art as it is evident by the teaching of Maruyama (Figure 2, where objective lens **10** has a first and second curved surface (**11,12**) with a first surface has a greater or lesser degree of curvature than the second surface). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the final lens element of Yabu by having a first and second surface with the first surface region being greater or less

than the degree of curvature of said second surface and with the second curved surface region facing the horizontal support surface for at least the purpose to correct aberrations of the projection system.

Allowable Subject Matter

14. The following is an examiner's statement of reasons for allowance: the following prior art does not teach or disclose nor render obvious over "wherein a relative horizontal velocity between said proximal lens surface and said horizontal support surface is small enough to ensure that turbulence and air bubbles created in said liquid by said relative horizontal velocity do not cause significant degradation of an imaging quality of the apparatus" in combination with the rest of the limitations.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

15. Claims 9-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art discloses an optical element utilized in

an immersion system: Suzuki (US 2002/0019136), Lin et al (US 2005/0100745) and Batchelder (5,900,354).

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 7:30 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571)-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin Gutierrez
Examiner
Art Unit 2851

William Perkey
Primary Examiner

December 22, 2005